# Sustaining Hype? Massive Open Online Courses (MOOCs) and Open Access Course Materials

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*In the three years since Massive Open Online Courses (MOOCs) reached critical mass in higher education, leading research universities across the world continue to participate through providers such as Coursera. Have practices regarding course materials listed in MOOCs changed during this time? Are more Open Education Resources (OERs) being used? Is content from institutional repositories being included? This paper will examine the current practices regarding "openness" and course materials in MOOCs.*

## Introduction

Massive Open Online Courses (MOOCs) provide educational opportunities for anyone in the world who has an Internet connection. While there are varying degrees of access across myriad providers and platforms, and a diverse array of course content on every imaginable subject, an underling principle central to MOOCs is that they are freely available.[1] This differs greatly from the tuition-based model of higher education in many countries across the world.

Open Education Resources (OERs) are similar in that they too are freely available. In addition to this ease of access, OERs are additionally open because of their license agreements, which allow them to be reused for educational purposes.[2] A specific type of OER, the open textbook, can be particularly useful in the open education environment of MOOCs as students would have easy access to a core learning material. This supplements the video lectures and peer-learning which currently constitute many MOOCs from university-partnered providers.[3]

In 2014, the Association of College and Research Libraries (ACRL) published a white paper by Carmen Kazakoff-Lane that examines the intersection of MOOCs, OERs, and libraries. This white paper outlines many of the pertinent issues facing libraries as these open learning initiatives deepen and broaden over time. Central among these issues are the effectiveness and sustainability of MOOCs and OERs, and, in particular, the awareness of OERs.[4] Libraries have battled "on behalf of open access [and] together with their increasing encapsulation of relevant publication, multimedia, instructional design, and intellectual property services, means they have the credibility, knowledge, and relationships needed to argue for and support an open education consistent with all of their values, not just some."[5]

The issues outlined by Kazakoff-Lane, and her assertion that libraries can play a critical role in open education regarding MOOCs and OERs, are central to the study discussed in this paper. This study, which analyzed course pages and syllabi from MOOCs of-

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fered by university-partnered provider Coursera in January 2015, categorizes course materials by their "openness" and their availability to students. In particular, are open textbooks, open access scholarly publications, and other types of OERs being listed for student use in these courses?

## Background

Elements of online open education have been in place as early as 2002, when the Massachusetts Institute of Technology's (MIT) OpenCourseWare initiative, which provided free and open access to the same educational materials that enrolled MIT students used, was rolled out.[6] The first true MOOC, however, was "Connectivism and Connective Knowledge" developed and taught by Stephen Downes and George Siemens in 2008. This course focused on the constructivist approach to knowledge and learning, which was both the subject and organization of the course.[7] Constructivism, or networked learning theory, emphasizes the role of socialization and technology, among other elements, in learning;[8] courses modeled on this approach were called constructivist MOOCs, or cMOOCs.[9]

It was not until four years later, however, that MOOCs reached critical mass. In her article for *The New York Times*, Laura Pappano declared 2012 "the year of the MOOC" as universities began to partner with MOOC providers such as Coursera and edX to bring courses developed and taught by their faculty members to the masses.[10] Coursera, a private venture founded by Stanford University professors Andrew Ng and Daphne Koller, and edX, a non-profit partnership established by MIT and Harvard University, eventually included university partners from some of the most distinguished and prestigious higher education institutions in the United States.[11] Initially known as xMOOCs, to differentiate their instructivist learning style and more traditional course structure from cMOOCs, the ascendant popularity of these courses has led to them being known simply as MOOCs.[12] As more and more universities joined the open education movement, the academic library community responded in kind to address potential opportunities and challenges inherent in an open learning environment.

In March 2013, OCLC organized a conference at the University of Pennsylvania titled "MOOCs and Libraries: Massive Opportunity or Overwhelming Challenge?" Presentation topics included questions around course production, pedagogy, library support and services, information about course-takers, copyright, licensing, and open access and OERs, among others.[13] Around the same time, librarians formed communication channels, such as blogs and interest groups, to discuss MOOCs and library-related issues.[14] The professional librarian literature echoed the need to understand MOOCs and their potential implications on libraries.[15]

The concept of openness is one such implication. Through the support and education of open access and the development of institutional repositories, academic libraries have long been involved with openness.[16] Support for the creation, access, and use of OERs and open textbooks are a natural evolution of this work. The libraries at Temple University and the University of Massachusetts, Amherst (UMASS) are two such examples of burgeoning work around OERs. Temple University offers faculty a stipend to develop alternative textbooks from existing open content and materials licensed by the library.[17] UMASS calculated savings to students of over $205,000 through the first two rounds of their Open Educational Initiative, a similar program that gave grants to faculty to develop OER alternatives to traditional textbooks.[18] The University of Minnesota's Open Textbook Library program provides a repository of open textbooks that are organized according to subject area. This program, which includes partners BC Campus (British Columbia, Canada higher education institutions), Purdue University, Cal Poly San Luis Obispo, Oregon State University, Cleveland State University, University of Oklahoma, and Minnesota State Colleges and Universities, advocated for faculty peer reviewers of their listed content to further increase its use and impact.[19]

## Literature Review

This selective literature review will focus on MOOCs and OERs as they pertain to this study, and will not be exhaustive. A detailed overview of MOOCs in the scholarly literature of education research can be found in the work by Liyanagunawardena, Adams, & Williams, including categorizing research by sub-discipline and identifying questions for future research.[20] Yuan and Powell (2013) also provide a history of the MOOC movement, and discuss the implications MOOCs and open education may have for higher education including increased globalization, increasing demand for access to higher education, and the changes in cost, affordability, and economic models.[21] De Langen and van den Bosch (2013) agree that MOOCs will open up education, particularly for future learners in emerging and developing countries, and will also continue to influence traditional courses through the flipped classroom model around which they are based.[22]

In order for educational content to be best utilized in a MOOC environment, OERs must continue to be developed and promoted. Hilton, Wiley, Stein, and Johnson (2010) reiterate the four "Rs" of openness that clearly distinguish OERs from other types of content; these include reuse, redistribute, revise, and remix.[23] Wiley (2014) has since added an additional "R," which is retain, making it five "Rs" against which to measure openness.[24] Wiley, Bliss, and McEwen (2014) further clarify the definition of OERs to be "educational materials which use a Creative Commons license or which exist in the public domain and are free of copyright restrictions."[25] This means that OERs are not just freely available, but are intended for reuse based on their licenses.[26] Blyth (2014) includes online textbooks, supplementary exercises, lesson plans, language corpora, and annotation tools in his framework of OERs.[27] This could make them particularly useful in an open education environment involving MOOCs.

While both MOOCs and OERs are mature topics in the field of education research, they are still emerging in the scholarly literature of library science. The professional literature of academic librarians has included informational articles, resource lists, and interviews with experts on OERs as early as 2009, with much of the discussion centered on the rising cost of textbooks and the affordability of higher education.[28] This issue drives the burgeoning studies appearing in the scholarly literature as well.

Mitchell and Chu (2014) surveyed all tenure track and adjunct faculty at California State University San Marcos to assess their willingness to support online scholarly materials.[29] Of the 107 respondents, 70% were interested in utilizing free or low-cost primary source materials, in their pedagogy or curriculum development, while 83% indicated that the cost of textbooks was very important or important in their course planning.[30] The development, support of, and advocacy for open textbooks by academic libraries is similarly discussed by Okamoto (2013), who writes "historically an advocate for access to information and a key campus player in student learning, academic libraries are a natural partner in OER initiatives and a potentially powerful voice for more affordable learning resources."[31] Fisher and Gallagher (2014) demonstrate this in their overview of the library's involvement in the development of an online textbook project at the University of Otago in New Zealand, where serving in an advisory capacity enhanced collegiality between library staff and faculty in addition to producing a learning object.[32] This potential for collaboration between librarians and faculty on OER education, creation, and access underlies is a promising one within an open or traditional higher education environment.

## Methods

This study was designed to observe common practices regarding the types of course materials listed in Coursera MOOCs between January 1, and January 31, 2015. Specifically, it examines how "open" these course materials are. This is a follow-up study, using similar methods, to a research project conducted by the author in 2013 that looked at both Coursera and edX over a three-month period (January through

March 2013).[33] Coursera was selected to analyze on its own in this study due to the great increase in the number of English language courses offered in the 2015 time period (114 total courses) and the wide variety of global university partners (99 at the time of the study).

To gather the data, the author registered for each Coursera MOOC offered in January 2015. Identifying information about each course was recorded, including the course title, instructor(s), university, subject, and date offered from the course page. Once registered, screen shots were captured of the course page, which often contain a section titled "Suggested Readings" or a FAQ with readings information, the syllabus (if there was one), and any textbooks or readings listed therein. Each screen shot was then annotated to indicate the type of material, either as a textbook or readings; textbooks included books or book chapters introduced or mentioned as such by the course instructor, while readings included a wide array of materials, such as scholarly articles, news articles, web publications, web sites, or blog posts.

Once the material type was determined, the level of openness was analyzed. This analysis included two broad categories; "free," or any textbook or reading that was provided in full via a web link or PDF; and, "pay," or any textbook or reading that required a fee or cost to access, or a list of resources with no path to access (such as a bibliography or list of references to scholarly articles). If an item was determined to be "pay" only, the only further analysis was to note if the item was available via web link for purchase or rent, or it if it was simply listed as a reference. The main determining principle of an item being considered "free" was if the author could access it immediately at the time of annotation, without needing to purchase it or access it via library services or authentication. During the initial data collection process, these designations were given at the course level, therefore it was possible for a course to have both "free" and "pay" course materials.

After being categorized as "free," the course material was further annotated to determine if it was "open." An item was considered open if it met the five "Rs" (retain, reuse, redistribute, revise, and remix) with a Creative Commons license (allowing attribution, share alike, and did not include a "no derivatives" clause), or was linked to through an open access institutional or discipline repository.

There are several limitations to this study. First, the author was the sole arbiter of the above categorizations, for both the course material type (textbook or readings), and for the distinctions between "free," "open," and "pay." Second, the screen shots and annotations provided the only access to the course materials once the class ended, provided it was not archived by the course instructor for future access; being so, the author was unable to verify all course material annotations after the initial period of analysis. Lastly, while sections of this paper will refer to the previous study conducted by the author in 2013, no direct comparison or statistical analysis can be made between the results due to the following: the different time period of analysis (one month in 2015 versus three months in 2013); a change in categorization (in the previous study the author did not further analyze a resource once noted as "free" or "pay"); and, due to the increase in the number of Coursera MOOCs included in this study's sample (114 in January 2015) as compared to the previous one (22 in January 2013).

## Findings

This analysis included 114 Coursera MOOCs. Of these, 29 were offered "on demand," or had no set time period, while 85 were offered for a set time that included at least one day in January 2015. Organized into their broadest subject areas, based on the first or only subject listed on the course page, 49 courses were in the sciences (including health sciences, physical sciences, life sciences, computer sciences, and mathematics), 48 were in the social sciences (including education, business, economics, information technology, and law), 13 were in the humanities (including music, film, and audio), and 4 did not have a subject listed. These courses were offered by 51 different global university partners; with five universities offering at

least five different courses (Johns Hopkins University with 13, Stanford University with seven, University of Maryland College Park with seven, Duke University with six, and the University of Illinois Urbana Champaign with five).

**TABLE 1**
**Coursera MOOCs and Course Material Types**

| | | |
|---|---|---|
| No additional course material | Total | 31 |
| "Pay" Only | Textbooks Only | 25 |
| | Readings Only | 2 |
| | Textbooks and Readings | 1 |
| "Pay" and "Free" | Textbooks Only | 5 |
| | Readings Only | 1 |
| | Textbooks and Readings | 27 |
| "Free" Only | Textbooks Only | 5 |
| | Readings Only | 12 |
| | Textbooks and Readings | 5 |
| | **Total** | **114** |

### *No Textbooks and/or Readings*

There were 31 courses that had no textbooks and/or readings listed on the course page or on the syllabus. Two of the courses stated that they were self-contained, and that no other resources but the video lectures would be needed for complete the class. The remaining 29 made no mention of a textbook or readings.

### *"Pay" Only Textbooks and/or Readings*

There were 28 courses that had only "pay" textbooks and/or readings listed on the course page or the syllabus. Of these, 25 had textbooks only, while one had both textbooks and readings, and two had readings only. From the 26 total courses that listed a "pay" textbook, 12 provided a link to purchase (to a publisher site, Amazon.com, or Google Books); six courses provided a link to Chegg.com which included an option to rent the textbook, while eight courses provided only a reference of the textbook with no link or pathway to purchase or rent. It should be noted that only two of these courses required or strongly recommended the purchase of the textbook; the other 24 noted that the textbooks were suggested or recommended, often accompanied by a message about the textbooks facilitating a deeper understanding of the subject beyond what the video lectures could provide.

There were three total courses that included "pay" readings on the course page or syllabus, and of these, two contained scholarly articles in a reference list and provided no link or pathway to access the articles. The remaining course provided links to trade publications, some of which required a membership fee to access articles or resources from the publication.

### *"Pay" and "Free" Textbooks and/or Readings*

There were 33 courses that listed both "pay" and "free" textbooks and/or readings, meaning that somewhere on the course page or the syllabus both "pay" and "free" course materials were included. Of these 33 courses, 27 had both textbooks and readings, while five had only textbooks, and one had only readings.

Each of the 27 courses that had both textbooks and readings had at least one "pay" textbook listed; 15 of these provided a link to Amazon.com or the publisher web site for purchase, seven of these were listed with no links provided, and three provided a link to Chegg.com with the option to rent the textbook. Among these 27 courses, 8 had "open" course material available as well. This 'open' material took the form of scholarly articles available via an open access institutional repository, scholarly articles available via an open access discipline repository, historical documents in the public domain, an open textbook, and an open access journal. Aside from these "open" materials, each of these 27 courses also had "free" course materials in the form of article PDFs, links to web pages, and a non-open access repository.

Of the five courses that had both "pay" and "free" textbooks as course material, but no additional readings, four of these provided a link to Amazon.com or the publisher site to purchase, and one was listed with no link. While three of these courses provided access to "free" textbooks in the form of a PDF of a book

(with no Creative Commons license), a link to a preprint of the listed "pay" text, and supplements to the "pay" text, two courses provided access to "open" textbooks. One linked to a Wiki of the book, hosted by the University of California Davis, and had a Creative Commons license allowing for sharing and adapting.[34] The other linked to an "open" chemistry textbook at Boundless.com, which also has a Creative Commons license that allows for sharing and adapting.[35]

The one course that only had both "pay" and "free" readings provided DOI links to subscription-only scholarly journal articles, while also providing access via links to "free" web content.

### *"Free" Only Textbooks and/or Readings*

There were 22 courses that listed only "free" course materials. Of these, 12 listed only readings, five listed only textbooks, and five listed both textbooks and readings.

Of the 12 courses that had only "free" readings available on their course page or syllabus, nine provided access to those readings by linking to a PDF of an article, case study, or report. Of the three that did not include PDFs, two provided access to "open" readings; one via links to open access scholarly journal articles, and the other to open data repositories via the World Health Organization and World Bank web sites.[36] The remaining course linked out to a free web resource to supplement the video lectures.

Five courses contained only "free" textbooks among their course materials. Two of these courses linked to PDFs of entire textbooks, while one included PDFs of chapters from a textbook. The remaining two courses both had "open" textbooks. The first was available from Pennsylvania State University, and the second via the OpenStax OER platform.[37]

Five courses also had both "free" textbooks and "free" readings. Three of these courses included PDFs of book chapters alongside PDFs of scholarly articles. The remaining two courses included PDFs of entire textbooks in addition to PDFs of scholarly articles. One course also linked to an open access discipline repository, the Social Science Research Network (SSRN), to include "open" scholarly articles.[38]

## Discussion

In total, 83 courses, or 73%, had some type of course material listed on or linked within its course page or syllabus. Courses that had at least one material that was "pay" comprised 54% (61 total) of those offered, while those that had at least one course material that was "free," comprised 48% (55 total); this exceeds 100% because of the overlap of 33 courses that included both "pay" and "free." Out of all the courses offered, 13% (15 in total) included "open" course material.

Even though a direct comparison cannot be made between this study and the 2013 study conducted by the author, as outlined in the methods section, in gen-

**TABLE 2**
**Open Textbooks Used in Coursera MOOCs**

| Course Name | University | Textbook Provider | Creative Commons License |
|---|---|---|---|
| Advanced Chemistry | University of Kentucky | Boundless.com | Attribution-ShareAlike 4.0 International |
| Geospatial Intelligence and the Geospatial Revolution | Pennsylvania State University | Pennsylvania State University, College of Earth and Mineral Sciences | Attribution-ShareAlike 4.0 International |
| The Governance of Non-Profit Organizations | University at Albany—SUNY | Open SUNY Textbooks | Attribution-NonCommercial-ShareAlike 3.0 United States |
| Introduction to Sustainability | University of Illinois Urbana Champaign | OpenStax | Attribution 3.0 Unported |

Note: Creative Commons version 4.0 includes an International option which replaces the 3.0 Unported option in the updated suite of licenses. See https://wiki.creativecommons.org/License_Versions.

eral the results are similar. In 2013, 41 out of the total 80 courses, or 51% had a "free" course material; 44 out of 80 or 55% had a "pay" course material, and 88%, or 70 out of 80 had course materials. Only one course linked to a scholarly article in an open access repository in 2013; in the current study, four courses did so.

In this study, 66 of the courses (58%) had a textbook, while 44 of the courses, or 39%, had course readings, compared to 48% and 55%, respectively, in the 2013 study. While it cannot be stated with certainty, a possible reason for the increase in the number of courses with textbooks, aside from the much larger number of courses in this study, may be attributed to a program between the textbook platform Chegg.com and Coursera beginning in May 2013, during which e-textbooks were to be available for a discount, alongside some free content, for the duration of the course.[39] It should be noted that no textbooks were available via Chegg.com during the 2013 study.

## Conclusion

The hype surrounding MOOCs as a major disruptor in higher education has calmed down considerably from the halcyon days of 2012. Though MOOCs may not radically change the way universities educate their students, they do offer myriad opportunities for research.[40] It should be noted that there was a five-fold increase in the number of Coursera MOOCs being offered in January 2015 (114), compared to what was offered in January 2013 (22); university partners are still very much investing resources, both time and financial, into the MOOC movement.

As evidenced by this study, there are also opportunities for faculty members at MOOC-affiliated higher education institutions to better integrate freely available, if not open, materials into their courses; just under half did so during January 2015.[41] Although the additional option to rent textbooks via Chegg.com presents a potentially less expensive alternative for the Coursera student who wants to delve deeper, the many available open textbook alternatives, such as OpenStax, Flat World Knowledge, Boundless.com or the University of Minnesota's Open Textbook Library, provide little to no financial barriers. Affordability continues to be a major topic of discussion on college campuses today; perhaps as OERs become more available and accessible for tuition paying students, there will be even more quality textbooks to select for inclusion in MOOCs.

As academic libraries invest more time, energy, and resources in the OER movement, continued momentum in the open access scholarly publishing area is vital as well. Though course readings were provided in 42 courses in this study (37% of the total), four courses linked to scholarly articles in open access repositories, while two specifically mentioned open access journals. As open access becomes more prevalent, and as more faculty deposit their works in institutional and discipline repositories, the body of "free" and/or "open" academic literature from which to choose can only improve the quality of open education.[42] For liaison and subject librarians, the work to continue to educate the teaching faculty and students at our institutions on the benefits of OERs and open access remains in front of us.

## Notes

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